witty remarks and humour. He covers a large ground, and every chapter is packed tight with matter. This makes his work easier to recommend to the reader than to describe or epitomise. We may select one or two points of special interest. One of the most awkward of the realist's problems is to determine the exact status of "images." This problem is discussed in a chapter entitled "The Stuff of Fancy." It begins by directing attention to a very serious defect in our vocabulary. We have one and the same word, "imagination," for images of scenes we remember or anticipate, and for fancies. We have, indeed, the two terms "imagination" and "fancy," but they are in ordinary discourse interchangeable. It is a difficulty the present writer has found in trying to present Croce's æsthetic theory in English. Our words "imagination" and "fancy" do not follow the same articulation of meaning as the Italian words "fantasia" and "immaginazione." This reference to Croce is not casual. If anyone is interested in a direct opposition between two philosophical theories of the nature of imagery, he will find it by comparing the first chapter of Croce's "Estetica" with Prof. Laird's theory concerning the "Stuff of Fancy." "Images, in a word, are parts of the physical world *imaged,* and that is what we discover through the fancy," concludes Prof. Laird. "Lo spirito non intuisce se non facendo, formando, esprimendo," says Croce.

Realism is very clear and emphatic in affirming the existence of the object, and that the knowledge of it is the mind's discovery; but there is another kind of existence—namely, that of the mind itself. Does the mind discover this existent? Prof. Laird finds no difficulty in answering "Yes." The argument is given in the chapter entitled "The Mind." In neurological theory he follows Sherrington. In philosophical theory his main contention is that in introspection we inspect awareness, but the act of inspection is different from the act of which it is aware. Our minds, he adds, are rich enough to contain a multitude of awarenesses almost at the same moment.

(2) The same problems are discussed in "Studies in Contemporary Metaphysics," and there is the touch of nature making realist and idealist kin in the underlying motive of Prof. Laird's epilogue and of Prof. Hoernlé's prologue. Both philosophers feel the need of justifying the human instinct to philosophise. Both give practically the same answer, and both have the same distinctly sad refrain. "Is the pursuit of philosophy worth while?" "Those who have devoted themselves to it have found it so, and they alone are in a position to judge."

The idealist's difficulty, unlike the realist's, is not concerned with the first step. The idealist has no initial assumption to negotiate; his difficulty is with the journey's end. The paradox in his case is that knowledge begins with the consciousness of an absence, with a datum the characteristic mark of which is partiality and incompleteness, while it presents to the mind a task to be accomplished. Knowledge is therefore ideality from the start, and its highest attainment in integration—the concrete universal, the absolute—appears elusive, and its objectivity unconvincing.

Prof. Hoernlé criticises, at times with brilliant effectiveness, the various constructive efforts which have been and are being brought to bear on the epistemological problem. His six years at Harvard have evidently been occupied with a vigorous championship of idealism in the homeland of new realism and behaviourism. The most arresting chapter in his deeply interesting book is that entitled "Saving the Appearances." Not only does he there offer us a constructive theory of his own, but he also demonstrates the absolute bankruptcy of realism when face to face with the demands, not of the plain man, but of the scientific worker. It is the physicist and biologist who must have the secondary qualities restored to the objective world. It is the realist who has filched them, and the idealist who alone, in Prof. Hoernlé's view, can restore them.

In these two books we have the controversy between contemporary realism and idealism represented by sturdy champions, though at present neither can claim to be bestriding a prostrate foe.

H. WILDON CARR.

Vertebrate Morphology.

Vertebrate Zoölogy. By Prof. H. H. Newman. Pp. xiii+432. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1920.) 16*s*. net.

THE leading feature of this book is an attempt to interpret the structure of vertebrate animals in terms of the "axial gradient theory." This theory, enunciated by the author's colleague, Prof. Child, is based upon certain facts of vertebrate development. These show that along the three axes of the body—longitudinal, vertical, and transverse—the rate of differentiation is not uniform, but progresses more rapidly in one direction than in the reverse. Thus the head develops faster and farther than the tail; the

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dorsal organs (such as the nervous system) than the ventral; and the tissues adjacent to the middle line than the outer tissues. The flow of matter and energy along these axes is apparently faster in certain directions, or the developmental impulses are transmitted more rapidly in these directions, than in others.

In order to test this view, the author has performed a number of experiments. He has placed the developing eggs of certain fish in water to which were added substances, such as alcohol and cyanides, that lessened the rate of natural development, and he placed others under adverse conditions, such as intense cold or diminished oxygen pressure. The results of these experiments, made by Prof. Newman, show that those embryos which survived exhibited most retardation in those regions where normal specimens normally reared undergo their most rapid development. On continuing these experiments, however, he found that a certain number of the experimental animals recovered from this inhibitory effect, and that this recovery is most marked in the very regions which had previously been most depressed. For example, the development of the head was at first retarded, but if the fish survived this first period of life under experimental conditions, then the development of its head was accelerated, and, indeed, to such a degree as to render it incapable of continued existence. These non-viable embryos exhibited the strangest appearance. Some "consisted of nothing but isolated eyes"; others "merely of heads with large rolling eyes and a tiny indifferentiated appendage that stands for the rest of the body"; others, again, "became broad and flat, like a skate, or high and compressed, like a sunfish. In fact, a good assortment of experimental monsters will furnish parallels to most of the stock types of form-distortion seen in the specialised and degenerate groups of fishes" (p. 161). We can only regret that the author has not reproduced figures and descriptions of these interesting monsters, or given references to the literature.

These results lead the author to seek for a cause which has acted upon growth and development during the course of animal history somewhat in the way that the depressing agency of his experiments has led to modification of form. The problem is to explain the elongated newt and the truncated frog; in other words, the tendency of animal groups to cephalisation, to abbreviation of the abdominal and caudal regions in the more highly organised members of most classes. Here he has nothing to offer us. He speaks, as so many American writers on biology do, of "the ageing of the hereditary chromatin" as an internal factor that has operated in preserving, for example, the neoteric or perennially youthful type of body, or in other ways. He attempts to correlate the elongated form of body with the effect of low temperatures acting as a depressing agent. We are put off with phrases such as "lowered rates of chemical metabolism" and "racial senescence," expressions which really have no scientific content. The moral of all this is that we do not know enough evolutionary physiology to enforce conclusions drawn from our anatomical and developmental records of animal structure by conclusions based on corresponding records of their past and present living processes. The anatomical evidence alone leads to such melancholy exhibitions of inconclusive reasoning as are found in the discussions on animal phylogeny in this book; and if the author has not been successful in applying physiological tests to animal pedigrees, we can but applaud his courage in making the attempt.

F. W. G.

Ancient Metal Implements.

Tools and Weapons: Illustrated by the Egyptian Collection in University College, London, and 2000 Outlines from Other Sources. By Prof. W. M. Flinders Petrie. (British School of Archæology in Egypt and Egyptian Research Account, Twenty-second Year, 1916.) Pp. vii+71+lxxix plates. (London: British School of Archæology in Egypt; Constable and Co., Ltd.; Bernard Quaritch, 1917.) 35*s.* net.

ONE of the ever-present problems of archæology is the degree of interdependence in which the ancient civilisations stood to one another in the matter of customs, religion, and the material objects of everyday life. Where undoubted importations occur the question becomes simple, but in the early ages of man's civilisation these imports are more often lacking, and the sole evidence available comes from a typological comparison of various classes of objects. In the volume under review Prof. Flinders Petrie has devoted himself to a study of Egyptian implements other than most of the stone types, and by the aid of numerous figures of similar implements from other countries, chiefly in Europe and Western Asia, he has sought to demonstrate the part played by Egypt in the invention and development of the various tools and weapons known to the ancient world.

If one fact emerges more clearly than another from this study, it is the extraordinarily small

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